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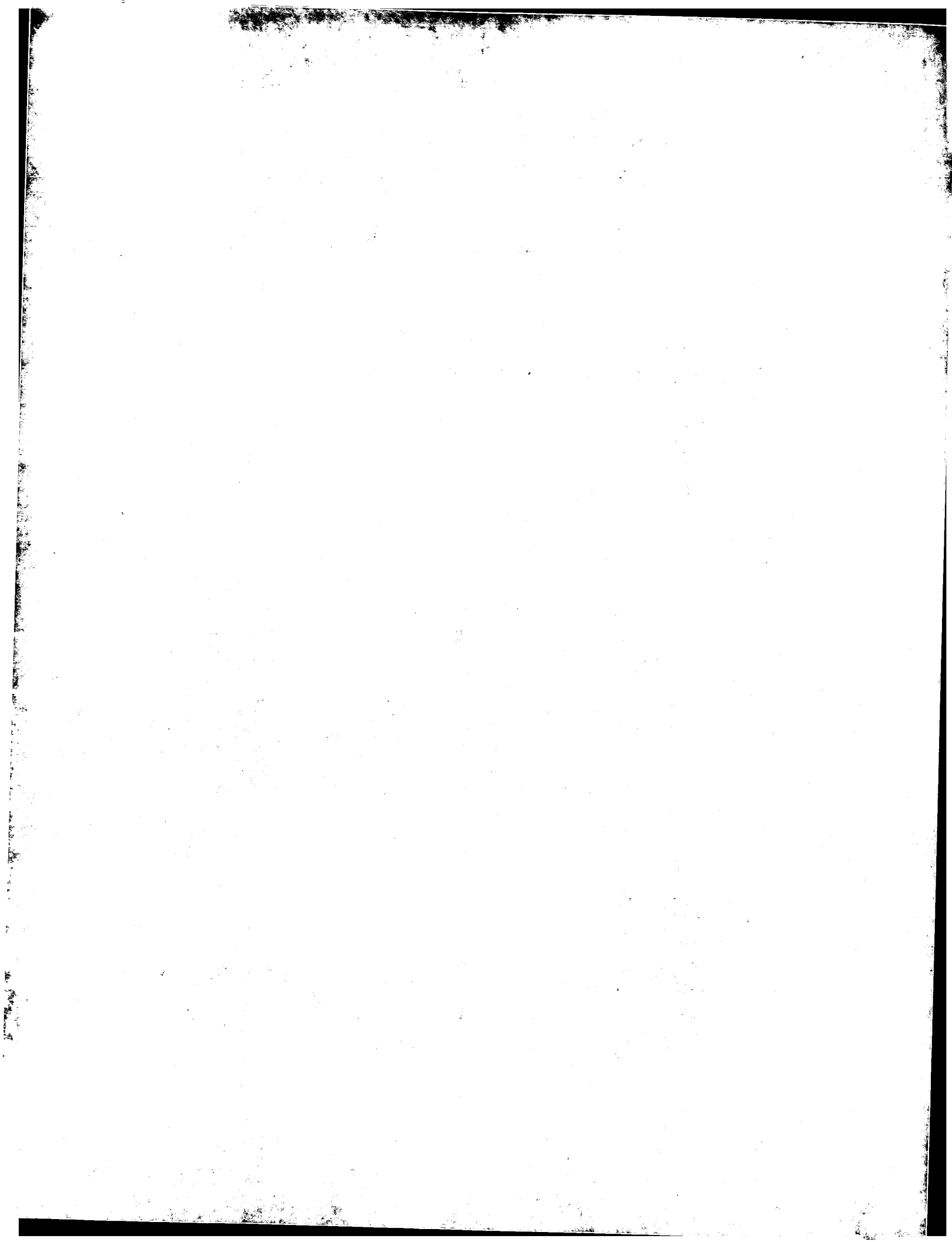
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# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### DRAWINGS ATTACHED

#### Improvements relating to Rod-like Article Transport Apparatus

We, JAN ANTONI RAKOWICZ, MICHAEL AREM PYM, both British Subjects, and MOLINS MACHINE COMPANY LIMITED a British Company, all of 2, Evelyn Street, Deptford, London, S.E.8., do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns improvements relating to rod-like article transport apparatus including suction means for holding rod-like articles (e.g. cigarettes) to the flutes of a drum and in particular to porting means by which suction is admitted to the drum.

Suction drums are well known for use in moving cigarettes, which may be travelling in a row (from one position to another), with the longitudinal axes of the cigarettes transverse of their direction of movement, e.g. the cigarettes may be picked up individually from one surface and moved to another surface. Alternatively, the drum may be used when movement of cigarettes in "line ahead" is to be replaced by movement which is transverse to their longitudinal axes. Other arrangements are also possible. In all cases, however, where the cigarettes are held suctionally in the flutes of a drum it is necessary that there shall not be an excessive admittance of atmospheric air to the suction source and that the openings or holes through which suction acts to hold a cigarette in a flute shall not block up with foreign matter such as dust from the tobacco in the cigarettes or fluff from the paper enveloping the tobacco or from any other air-borne foreign matter. This invention sets out to provide an improved apparatus employing a suction drum consonant with these requirements.

According to the present invention there

[Price ...]

is provided rod-like article transport apparatus comprising a fluted drum, rotatably carried on a sleeve containing a suction chamber, each flute of said drum being provided with an opening and said sleeve being provided with a port so disposed as to provide communication between each opening and the suction chamber inside the sleeve whenever that opening and its associated flute are within a selected range of rotational positions, in which said port is so shaped that rotation of the drum causes each opening to communicate full bore with the suction chamber before communicating through a restriction.

In this way each opening to a flute is cleared from an accumulation of foreign matter before a cigarette is picked up. At the same time the size of the port through which the suction acts can be reduced to a minimum so as to prevent an excessive inflow of atmospheric air.

Apparatus in accordance with the invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a section through suction drum apparatus,

Figure 2 is a diagrammatic representation of a development of the drum of Figure 1.

In Figure 1, a suction drum 1 rotating in the direction of arrow 2 and driven by means not shown transfers cigarettes 3 and 4 from a first drum 5 to a second drum 6. The drums 5 and 6 are driven by means which again are not shown in the directions indicated by arrows 7 and 8 respectively. The suction drum 1 is in contact with and rotates about a sleeve 9 having a port 19. Flutes 10 are disposed around the circumference of the drum 1, each one being provided with an opening or elongated slot (see Figure 2). The port 19 has one end 12

(the upstream end considered in relation to the direction of rotation of the drum 1) enlarged so that its cross-section is at least equal to that of one of the slots 11. A recess 13 is cut in the surface of the sleeve 9 inside which is a suction chamber 14. The other end of the port 19 has an enlarged opening 20.

The apparatus operates as follows. The sleeve 9 is stationary and has the suction drum 1 rotating thereabout. The suction chamber 14 is in continuous communication with a suction source which is not shown. Each particular opening 11, which is an elongated slot as can be seen in Figure 2, moves first into conjunction with the end 12 of the port 19. Since the end 12 has at least the same cross-section as the opening 11 the latter is open full-bore to the suction chamber 14. Any foreign material that might have accumulated in the opening 11 is immediately swept by the air flow into the chamber 14. By making the end 12 slightly larger than the opening 11 the possibility of a projecting edge on which foreign matter might accumulate is removed. Thus each opening 11 is continuously cleaned once in each revolution of the drum 1. At the same time maximum suction is also applied to the opening 11 so that the chance of a positive transfer of the cigarette 3 from the drum 5 to the drum 1 is enhanced. It sometimes happens that small pieces of foreign matter run along the port 19 as an opening 11 passes therealong. By providing the end 20 all such pieces are sucked into the suction chamber 14 instead of building up at the end of the port 19.

If there were to be a cigarette missing in the position indicated by the cigarette 3 in Figure 1, suction in the chamber 14 would soon be lost through the full bore of the opening 11. It is, therefore, necessary to reduce suction loss to a minimum and this is effected by reducing the cross section of the port 19 as can be clearly seen in Figure 2. With a cigarette present in the appropriate flute the suction transmitted through the restriction in the port 19 is sufficient to hold the cigarette firmly in its flute. With a cigarette missing suction is indeed lost but not to the extent of destroying operative suction in the chamber 14.

As each opening 11 moves out of contact with the port 19 the suction chamber 55 no longer communicates therewith. Since, however, a cigarette in the appropriate flute prevents the entrance of air to destroy the residual vacuum left in the opening the cigarette remains adhering. As soon as the particular opening 11 moves into contact with the recess 13 air via the next downstream opening breaks the vacuum and releases the cigarette 4 as shown in Figure 1 for transfer to the second drum 6. 65

Each successive flute and opening goes through the same cycle of operations so that all cigarettes presented on the first drum 5 are successfully and successively transferred to the second drum 6. 70

#### WHAT WE CLAIM IS:—

1. Rod-like article (e.g. a cigarette) transport apparatus comprising a fluted drum rotatably carried on a sleeve containing a suction chamber, each flute of said drum being provided with an opening and said sleeve being provided with a port so disposed as to provide communication between each opening and the suction chamber inside the sleeve whenever that opening and its associated flute are within a selected range of rotational positions, in which said port is so shaped that rotation of the drum causes each opening to communicate full bore with the suction chamber before communicating through a restriction. 85

2. Article transport apparatus as claimed in Claim 1, wherein said restriction has a cross sectional area less than that of said opening. 90

3. Article transport apparatus as claimed in either Claim 1 or Claim 2, wherein the selected range of rotational positions extends from an article feeding surface (e.g. a drum) to a further surface (e.g. a drum) to which the articles are transferred. 95

4. Rod-like article transport apparatus constructed, arranged and adapted to operate as described herein with reference to the accompanying drawings. 100

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1 SHEET

COMPLETE SPECIFICATION

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